

REMARKS

Claims 1-20, 24-26, and 28-34 are currently pending. Claims 1 and 28 have been amended. Claim 34 has been added and are supported by Figure 3. Claim 27 has been canceled. It is respectfully submitted that no new matter has been added.

The Patent Office rejected claims 1, 8, 15, 25, 27, and 29 under 35 U.S.C. 112, second paragraph. Claim 27 has been cancelled. It is respectfully requested that the Patent Office withdraw its rejection of claim 27 under 35 U.S.C. 112, second paragraph.

Claims 1-11, 13-23, and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelgany et al. (US 6,584,090), and further in view of Shalom et al. (US 6,166,601) and further in view of Abdelmonem et al. (US 6,622,028). The rejection is respectfully disagreed with, and is traversed below.

Claim 1 recites

A mobile station comprising: a transceiver comprising a transmitter circuit having a transmit RF filter that passes a transmit band of frequencies that is partitioned into transmit frequency channels and a receiver circuit having a receiver RF filter that passes a receive band of frequencies that is partitioned into receiver frequency channels, wherein the transmit band of frequencies comprises at least one first end channel, at least one second end channel, and interior channels between the first and second end channels, wherein the receive band of frequencies comprises at least one first end channel, at least one second end channel, and interior channels between the at least one first and second end channels; and baseband circuitry capable of compensating for a non-ideal RF operation of channels from the transmit and receive bands of frequencies, the baseband circuitry arranged to compensate for the non-ideal operation of said RF filters of at least one of the at least one first and second end channels of the transmit and receive bands of frequencies and arranged to not compensate for the non-ideal RF operation of said RF filters of any of the interior channels of the transmit and receive bands of frequencies.

Claim 8 recites

A method for operating a mobile station comprising: providing the mobile station with a transceiver having a transmitter circuit having a transmit RF filter that passes a transmit band of frequencies that is partitioned into transmit frequency channels and a receiver circuit having a receiver RF filter that passes a receive band of frequencies that is partitioned into

receiver frequency channels, wherein the transmit band of frequencies comprises at least one first end channel, at least one second end channel, and interior channels between the at least one first and second end channels, wherein the receive band of frequencies comprises at least one first end channel, at least one second end channel, and interior channels between the first and second end channels; and compensating, in a baseband with the capability of compensating non-ideal RF filter operation for both RF receive and transmit channels, the non-ideal operation of said RF filters is provided for at least one of the at least one first and second end channels of the transmit and receive bands of frequencies when the at least one of the at least one first and second end channels is selected and for not compensating the non-ideal operation of said RF filters of the interior channels of the transmit and receive bands of frequencies when one of the interior channels is selected.

Claim 15 recites

A circuit comprising means for coupling to a transceiver having a transmitter circuit comprising at least one transmit radio frequency (RF) filter that passes a transmit band of radio frequencies that is partitioned into transmit RF channels and a receiver circuit having at least one receiver RF filter that passes a receive band of radio frequencies that is partitioned into receive RF channels, wherein the transmit RF channels comprise at least one first end channel, at least one second end channel, and interior channels between the first and second end channels, wherein the receive RF channels comprise at least one first end channel, at least one second end channel, and interior channels between the at least one first and second end channels, and means for compensating, in a baseband, for at least one of the first and second end channels of the transmit and receive RF channels when the at least one of the at least one first and second end channels is selected and for not compensating for the non-ideal operation of said RF filters of the interior channels of the transmit and receive RF channels when one of the interior channels is selected, wherein the circuitry is capable for compensating for the non-ideal RF operation of channels from the transmit and receive bands of frequencies.

Claim 25 recites

A mobile station comprising: a transceiver comprising a transmitter circuit having a transmit RF filter that passes a transmit band of frequencies that is partitioned into transmit frequency channels and a receiver circuit having a receiver RF filter that passes a receive band of frequencies that is partitioned into receiver frequency channels, wherein the transmit RF channels comprise at least one first end channel, at least one second end channel, and interior channels between the first and second end channels, wherein the receive RF channels comprise at least

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one first end channel, at least one second end channel, and interior channels between the at least one first and second end channels; and baseband circuitry capable of compensating for a non-ideal RF operation of transmit frequency channels and receive frequency channels, wherein the non-ideal RF filter operation is compensated for one of the at least one first and second end channels of the transmit and receive bands of frequencies when selected and the non-ideal RF operation is not compensated for any of the interior channels of the transmit and receive bands of frequencies when selected.

Claim 29 recites

A circuit comprising a circuit portion for coupling to a transceiver having a transmitter circuit comprising at least one transmit radio frequency (RF) filter that passes a transmit band of radio frequencies that is partitioned into transmit RF channels and a receiver circuit having at least one receiver RF filter that passes a receive band of radio frequencies that is partitioned into receive RF channels, wherein the transmit RF channels comprise at least one first end channel, at least one second end channel, and interior channels between the at least one first and second end channels, wherein the receive RF channels comprise at least one first end channel, at least one second end channel, and interior channels between the first and second end channels, and a circuit portion, in a baseband, for compensating at least one of the at least one first and second end channels of the transmit and receive RF channels when the at least one of the at least one first and second end channels is selected and for not compensating for the non-ideal operation of said RF filters of the interior channels of the transmit and receive RF channels when one of the interior channels is selected, wherein the circuitry is capable of compensating the non-ideal RF operation of channels from the transmit and receive bands of frequencies.

The primary reference Abdelgany discloses quantizers 108, encoders 36, and filters 38, 106, in a baseband area of a transceiver (FIGs. 3-6), but does not disclose equalization occurring in the base band. Abdelgany discloses that the transmit band is divided into multiple channels (column 4, lines 26-52), but does not disclose a problem with the RF operation of channels. Abdelgany does not even suggest a need or desire for modification to allow the baseband circuitry to compensate for the non-ideal operation of RF filters of at least one end channel of a receive or transmit band of frequencies and not to compensate for an interior channel.

Abdelgany discloses a circuit arrangement for CDMA/GSM operation in which the air interface technology is made adaptable by switching between sets of pairs of filters. In Abdelgany's RF transceiver, both transmitter and receiver chains contain an RF filter.

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Abdelgany only illustrates analog components of a transceiver and only briefly discloses digital control circuitry (e.g., col. 10, line 49, through col. 11, line 7). In the disclosure of digital control logic, Abdelgany discloses a mode selector that is configurable by remote commands or signal strength measurements. The mode selector determines the setting of the switches to set the device to CDMA or GSM mode. There is no disclosure or suggestion of equalization circuitry. Also, no baseband compensation circuitry for filter induced distortion in RF channels is disclosed by Abdelgany.

The Patent Office then cites Shalom et al. for disclosing a transceiver that applies digital equalization to an RF amplifier to produce highly linear amplification, and refers to col. 3, lines 29-65 of Shalom. The Patent Office continues by asserting (page 4, lines 1-15, of the Office Action dated January 11, 2007, as follows:

Shalom discloses that the equalization can be performed to correct non-linearities on the power amplifier or any other circuitry of amplifier 100 (Fig. 3, Col. 7, line 61, to col. 8, line 10). Examiner reads the circuitry of amplifier 100 as an RF filter that passes a band of frequencies. The equalizer will operate on any frequency band channel to be transmitted. Examiner reads any frequency band signal that is present in the transmitter path to be 'selected.' **Examiner additionally notes the phrase 'when the at least one RF channel is selected' in applicant's claim 1.** In the case that all channels are 'selected' then all channels will be equalized and the full bandwidth equalization of Shalom will read on claim 1. Examiner notes that claims 8 and 29 also recite that at least one signal may be selected. It would have been obvious to one of ordinary skill in the art at the time of this application to implement digital equalization for both the transmit and receive amplifiers and associated circuitry (the amplifier and circuitry inherently comprise RF filter because they have an impedance that has a certain frequency response at RF frequencies) for the advantage of producing a highly linear response from the circuit.

Applicant would like to point out that claim 1, contrary to the Patent Office's assertion, does not recite "when the at least one RF channel is selected."

Also, regarding the Patent Office assertion that "Examiner reads the circuitry of amplifier 100 as an RF filter that passes a band of frequencies," the only baseband circuitry in Figure 4 is in block 124, shown as a small portion of amplifier block 100. Shalom discloses transceivers 22, 24, 26 that provide an RF signal to an equalizer 104 that outputs an RF signal (see FIG. 3).

Shalom, in Figure 5, illustrates an equalizer 176. Shalom discloses the equalizer is formed of two Finite Impulse Response filters (column 10, lines 5-14). Shalom does not disclose the equalizer being part of baseband circuitry nor the compensation for non-ideal operation of RF filters of at least one end channel but no compensation for interior channels of a band of frequencies.

It is noted that Shalom et al. are concerned only with the transmit outputs of the multiple transceivers 22, 24, 26 shown in Figs. 1, 2 and 3, which are combined and applied to a single (common) base station transmitter 98. The total bandwidth of these signals is about 25 MHz (see col. 7, lines 17-31). As is stated in col. 3, lines 29-65, the goal is to digitally equalize the transceiver signals to correct for gain and phase distortions introduced by the power amplifier, as well as other elements of the feedforward amplifier. Shalom et al. describes a feedforward amplifier, where RF signals from a plurality of sources are down converted, digitally equalized to compensate the amplifier impacts, upconverted and fed to the amplifier for amplification. It does NOT seem to compensate for filter induced distortion as responsive to RF channels, neither does it give any hints this would be needed. Shalom's invention only concentrates on how RF amplifier induced distortion can be minimized. Furthermore, Shalom minimizes the interference to adjacent RF channels, whereas Applicant's claimed invention maximizes the signal-to-interference ratio of the transceiver signal. Shalom et al. does not discuss the receiver at all and only focuses in compensating amplifier response, not compensating RF filter non-idealities.

Based at least on the stated purposes of the Shalom et al. circuitry, i.e., to digitally equalize transceiver signals to correct for gain and phase distortions introduced by a transmitter power amplifier, as well as other elements of the feedforward amplifier, it is submitted that one skilled in the art would not find it obvious to implement digital equalization for **both** transmit and receive amplifiers. This is true at least for the reason that Shalom et al. are not seen to discuss in any detail the characteristics of the receiver part of the transceivers 22, 24, 26 shown in Figs. 1, 2 and 3, or the characteristics of any receiver amplifiers, or whether such receive amplifiers would benefit from any type of equalization. It is again noted that Shalom et al. desire to use digital equalization to correct for gain and phase distortions introduced by the **transmitter power amplifier, as well as other elements of the feedforward amplifier**. As such, it is clearly not admitted that one skilled in the art would have found it obvious "to implement digital

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equalization for both the transmit and receive amplifiers for the advantage of producing a highly linear response from the amplifiers", as stated by the Patent Office.

Still further, one may assume that any equalization that may be applied would be applied within the bandwidth of the "transmitter power amplifier, as well as other elements of the feedforward amplifier", and not within any bandwidth of the (not described) receiver amplifiers.

Abdelgany discloses no need or desire to equalize an end channel in which equalization is not provided for any interior channel in either a receive or a transmit band of frequencies. Abdelgany illustrates specific components in the transceivers of FIGs. 3-6. Abdelgany shows analog circuitry in a receive portion of the transceiver from antenna 22 up to the quantizers 108. The Patent Office suggests incorporating digital equalization circuit 104 of Shalom to modify Abdelgany. The purpose of digital equalization circuit 104 of Shalom is to equalize the signals from multiple transceivers before transmitted them through power amplifier 108 (column 7, lines 31-50). The multiple transceivers of Shalom are part of a base station (e.g., col. 7, line 17), whereas Abdelgany is directed to mobile stations (col. 1, lines 9-16).

Turning now to Abdelmonem et al., what is disclosed is simply a high temperature superconductor (HTS) filter 58 used in a base station receiver wherein

"in some embodiments of the present invention, an equalizer may be included to compensate for variances in group delay introduced by the HTS filter 58 within the passband. Equalization may be desirable when the aforementioned HTS path is utilized in connection with certain wide bandwidth communication systems, such as W-CDMA."

Abdelmonem describes a receiver front end and mentions that an equalizer could be added to compensate for variances in group delay caused by the filter in the front end. The passage cited by the Patent Office teaches that the compensation is done at RF frequency with RF components. It does not give any hint that a baseband signal would be used to compensate for RF-filter caused group delay. Also, it does not give any hint that a RF filter response compensation would be done according to the used RF channel.

Furthermore, claims 1, 8, and 25 recite a mobile station. Abdelmonem discloses a

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receiver front-end that includes a cryostat 52 for maintaining a cryogenic environment for certain components disposed therein (column 4, lines 15-17). Abdelmonem further discloses the cryostat 52 includes a housing 54 coupled to a cryorefrigerator by piping or hoses that carry a cooling fluid (column 4, lines 23-25). Abdelmonem does not disclose his invention as being in a baseband or a mobile phone. Instead, Abdelmonem discloses each configuration may be incorporated into wireless stations, such as a base station for a cellular, PCS, or other wireless system (column 3, lines 51-59).

Thus, the Abdelgany et al. reference teaches a transceiver having transmit and receive filters, where in the Fig. 4 embodiment cited by the Patent Office:

"..the RF filters in the CDMA transmit and receive paths of CDMA-900 and CSM-900 communication transceiver 180 have different passbands as compared to those in FIG. 3. First CDMA transmit RF filter-74, second CDMA transmit RF filter 78, and duplexer 82 have transmit passbands encompassing the CDMA-900 transmit band of about 824-849 MHZ. Duplexer 82 and CDMA receive RF image reject filter 92 have receive passbands approximately equivalent to the CDMA-900 receive band of about 869-894 MHZ" (col. 13, lines 5-14),

whereas Shalom et al. teach digital equalization to correct for gain and phase distortions introduced by the **transmitter power amplifier, as well as other elements of the feedforward amplifier**, and Abdelmonem et al. teach a HTS filter 58 used in a base station receiver, where an equalizer **may be included to compensate for variances in group delay introduced by the HTS filter 58 within the passband.**

Applicant has claimed a mobile station in claims 1-14 and 25-28. To modify Abdelgany by Abdelmonem, the cryorefrigerator apparatus disclosed by Abdelmonem would have to be incorporated into Abdelgany in a force fit that is not suggested by either Abdelgany or Abdelmonem.

None of Abdelgany, Shalom, and Abdelmonem disclose or suggest baseband circuitry capable of compensating for a non-ideal RF operation of channels from the transmit and receive bands of frequencies, the baseband circuitry compensating for the non-ideal operation of said RF filters of at least one of the first and second end channels of the transmit and receive bands of frequencies and for not compensating for the non-ideal RF operation of said RF filters of any of the interior channels of the transmit and receive bands of frequencies.

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Thus, claims 1-11, 13-23, 25, and 29 are allowable over Abdelgany, Shalom, and Abdelmonem.

The Patent Office rejected claims 1-3, 6-10, 13-15, 17-20, 25-29, and 31-33 under 35 U.S.C. 103(a) as being unpatentable over Abdelgany, U.S. Patent No. 6,584,090, and further in view of Abdelmonem, U.S. Patent No. 6,622,028, and Uddenfeldt, U.S. Patent No. 5,212,803.

Uddenfeldt discloses a method for selecting a strongest detectable dedicated control channel (DCCH). The method disclosed measures the signal strengths of the dedicated control channel (DCCH) of the channels and tunes to the strongest without use of an equalizer. If the signal quality is not there or is not detectable, the method selects the channel with the strongest signal with the equalizer. In Uddenfeldt, the use of the equalizer is kept to a minimum to conserve power and unlike the claimed invention is not used to a high signal-to-noise ratio.

Uddenfeldt discloses (column 5, line 63, through column 6, line 16) as follows:

The receiving frequency synthesizer 25 is ordered by the microprocessor 30 to generate the frequency $f_{\text{sub.1}}$ which corresponds to the first dedicated control channel. When the frequency is stable, the signal level meter 29 measures the signal strength and the microprocessor 30 stores the value. The same procedure is performed for the frequencies $f_{\text{sub.2}}$, . . . $f_{\text{sub.21}}$ corresponding to the remaining dedicated control channels and a ranking based on the signal strength is finally made by the microprocessor 30 at block 2. **The synthesizer 25 is then ordered to tune to the frequency $f_{\text{sub.1}}$ with the highest signal strength level, and the mobile will then make attempts to synchronize to this channel at block 3. With the mobile synchronized to this channel and the equalizer function disconnected, the channel decoder 21 detects the signal quality without the equalizer function (block 4, FIG. 4) and the microprocessor 30 determines if the received DCCH 1 burst signal is acceptable or not (block 5, FIG. 4). If the detection was not correct, microprocessor 30 sends a signal to the decision circuit 10 in order to connect the equalizer function.**

Uddenfeldt does not disclose compensating non-ideal RF filter operation. Instead, Uddenfeldt measures the quality of a signal to determine if equalization is needed. In Applicant's claimed invention, the baseband compensates for non-ideal RF operation of channels by compensating one or more end channels but no interior channels of a band of frequencies.

As with Abdelgany and Abdelmonem, Uddenfeldt does not disclose or suggest baseband

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circuitry capable of compensating for a non-ideal RF operation of channels from the transmit and receive bands of frequencies, the baseband circuitry compensating for the non-ideal operation of said RF filters of at least one of the first and second end channels of the transmit and receive bands of frequencies and for not compensating for the non-ideal RF operation of said RF filters of any of the interior channels of the transmit and receive bands of frequencies.

Thus, claims 1-3, 6-10, 13-15, 17-20, 25-29, and 31-33 are allowable over Abdelgany in view of Abdelmonem and Uddenfeldt.

The Patent Office rejected claims 4, 5, 11, 16, and 30 under 35 U.S.C. 103(a) as being unpatentable over Abdelgany, U.S. Patent No. 6,584,090, in view of Abdelmonem, U.S. Patent No. 6,622,028, and Uddenfeldt, U.S. Patent No. 5,212,803, as applied to claims 1-3, 6-10, 13-15, 17-20, 25-29, and 31-33 above, and further in view of Shalom, U.S. Patent No. 6,166,601.

Shalom discloses transceivers 22, 24, 26 that provide an RF signal to an equalizer 104 that outputs an RF signal (see FIG. 3). Shalom, in Figure 5, illustrates an equalizer 176. Shalom discloses the equalizer is formed of two Finite Impulse Response filters (column 10, lines 5-14). Shalom does not disclose the equalizer being part of baseband circuitry nor the compensation for non-ideal operation of RF filters of at least one end channel but no compensation for interior channels of a band of frequencies.

Thus, claims 4, 5, 11, 16, and 30 are allowable over Abdelgany in view of Abdelmonem, Uddenfeldt, and Shalom.

The Patent Office rejected claims 5, 12, and 24 under 35 U.S.C. 103(a) as being unpatentable over Abdelgany, U.S. Patent No. 6,584,090, in view of Abdelmonem, U.S. Patent No. 6,622,028, and Uddenfeldt, U.S. Patent No. 5,212,803, as applied to claims 1-3, 6-10, 13-15, 17-20, 25-29, and 31-33 above, and further in view of Lindoff, U.S. Patent No. 6,373,888.

Lindoff discloses channel estimation and does not disclose or suggest baseband circuitry capable of compensating for a non-ideal RF operation of channels from the transmit and receive bands of frequencies, the baseband circuitry compensating for the non-ideal operation of said RF filters of at least one of the first and second end channels of the transmit and receive bands of frequencies and for not compensating for the non-ideal RF operation of said RF filters of any of the interior channels of the transmit and receive bands of frequencies.

Lindoff discloses an equalizer 406 (column 6, lines 33-45). There is no disclosure by

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Lindoff of the equalizer being part of baseband circuitry nor the compensation for non-ideal operation of RF filters of at least one end channel but no compensation for interior channels of a band of frequencies.

Claims 1, 8, 15, 25, and 29 recite that RF filter operations are compensated for at least one RF channel but not all RF channels. None of the prior art of record, including Lindoff, appears to disclose or fairly suggest the above noted claimed subject matter of claims 1, 8, 15, and 25. Thus, claims 5, 12 and 24 are allowable over the prior art of record.

Response to Patent Office Arguments

The Patent Office on page 10, lines 1-6, of the Office Action dated January 11, 2007, asserted that Abdelgany (column 5, lines 25-35) discloses additional signal processing circuitry in the baseband and that this would make it obvious to implement the equalizer as part of the baseband signal processing electronics. **One of ordinary skill in the art would not be likely to look to a high temperature superconducting filter with its cryorefrigerator of a base station, as taught by Abdelmonem, to modify a mobile station of Abdelgany. Nor, would one of ordinary skill in the art be likely to look to another base station oriented reference, Shalom, which teaches equalizing the RF outputs of multiple transceivers, the result of which is transmitted.** As noted in MPEP § 707.07(g) "Piecemeal examination should be avoided as much as possible." There does not appear to be sufficient motivation in the secondary references to arrive at Applicant's claimed invention and the combinations presented appear to be formed by impermissible hindsight reconstruction.

The Patent Office is respectfully requested to reconsider and remove the rejections of the claims under 35 U.S.C. 103(a) based on the proposed combination of Abdelgany et al., Shalom et al. and Abdelmonem et al., whether or not in combination with Lindoff, or based on Abdelgany, Abdelmonem, and Uddenfeldt and to allow claims 1-20, 24-26, and 28-34. An early notification of the allowability of claims 1-20, 24-26, and 28-34 is earnestly solicited.

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Respectfully submitted:

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